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(54) Title: APPARATUS FOR SECURING FLEXIBLE PACKAGES TO A DISPLAY STRIP			
(57) Abstract			
<p>It is a system in which a desired number of flexible packages can be attached on the display strip successively to be more detachable and neither the strip nor the package gets damaged when detaching. Stripping process: the package of which process is completed with the packing machine is held by two reciprocal pneumatic grippers, and carried to a second station where it is sealed to the strip by means of small jaws under heat and pressure.</p>			

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WO 98/52823

PCT/TR97/00011

APPARATUS FOR SECURING FLEXIBLE PACKAGES TO A DISPLAY STRIP

2- BACKGROUND OF THE INVENTION**2.a- The Title Of The Invention :**

5 The fixing of flexible packages made by Vertical or horizontal form fill and seal packaging machines with a strip after being packed on a second station in the same machine by the help of small jaws, using the method of with heat and pressure in a way that they could easily be removed from the strip; shortly names as THE METHOD AND APPARATUS FOR
10 THE AUTOMATED ATTACHMENT OF DETACHABLY SECURING FLEXIBLE PACKAGES TO A DISPLAY STRIP, FROM WHICH THEY COULD EASILY BE TAKEN WITHOUT ANY DAMAGE, IS PERFORMED AT THE SECOND STATION OF THE TYPE VERTICALLY OR HORIZANTALLY FORM FILL SEAL PACKAGING MACHINE.

2.b- Field Of The Invention :

15 The invention involves the area;
Outlets like supermarkets, markets, shops and nutshops, where packages of appetizers like dried fruits, sunflower seeds, chips (potato, corn,tortilla, fabricated), extruded snacks and nuts are sold, utilize some methods in displaying their products. One of these methods is hanging packages strips arranged in a line. This method will be preferred by both the
20 sellers who have small shops because it makes arrangement and displaying easier and the consumers who can easily make their choice.
However, the present condition of the technique is a terrible expense for the producer and a painstaking procedure for the consumer. The packets should be safely arranged so that they will not fall down; they should only be taken by pulling downwards and neither the package nor the strip should be damaged in the meantime and nor the packages on the strip should be dropped.

The Present Condition Of The Technique :

30 The packages mentioned are usually produced in vertical or horizontal form fill and seal packing machines. The bottom of the packages is sealed at a speed of 15 -120 packages per minute using only one of the materials like polyethylene, polypropylene, cellophane, aluminium folio and bi-oriented polypropylene (bopp) (or several of them are laminated) and by the help of pneumatic, hydrolic or mechanical pressure properly selected for the material; the packages are filled and the tops are closed by sealing and cut and taken away from the machine by a conveyor which stands just below the packing machine. The packages taken away from the packing machine by a conveyor are unloaded into a second station where the packages are lined up on perforated cardboard strips by at least three manual workers. (Fig.5 Pos.M1, M2)

40 In a middle-sized factory with 15-25 packing machines, the number of workers needed is 45-75 in one shift and 135-225 in three shifts. Besides waste of labour and the difficulties it brings to the worker, the increasing expense is unaffordable for both the consumer and the manufacturer.

45 For this reason, the experts in many countries in the world have been working on this subject for years.

50 Some examples patented in the USA and our opinions about them and the advantages of our invention when compared to others are as follows.
Palmer U.S. Pat. No. 4.422.552 et al. and Palmer U.S. Pat.No.4.476.619 disclose methods and apparatus for folding the end seal or flange of a bag into the slot of a display card. The steps of folding and tucking the end seals of numerous packages into a slotted display card are often performed manually and consume considerable time the and expense. The prior art, however, includes alternative methods of attaching flexible packages to a display card. For example, Runner U.S. Pat.No.2.272.623 discloses a display card with packages removably attached thereto by adhesive. In Farfelly U.S.Pat.No.4.003.782 manufactured bags are applied to two lines of pressure sensitive adhesive and then stored in a carton or the like. It is also known to attach empty packages to a display or mounting support base and then fill and seal the packages.

55 See Hannon U.S.Pat.No.3.331.182 . Several problems arise with the aforementioned methods of securing packages to a display strip. One problem that often occurs when the

packages are adhesively attached to the display strip is that the packages cannot easily be removed from the strip without damaging the sealed condition of the packages.

In Patrea's patent with no. 3.864.895 in the USA only the packages made in vertical packing machine are glued onto the strip on a second station by a vacuumed arms on the conveyor.

Finally in Recot Inc.'s patent with no. 5.433.060 in the USA, the system of sealing the packages on strips under pressure and heat. Since in Recot's patent the packages are ripped from the strip, there are some cases where the packages, the strip and the hanger might be damaged, and also the other packages fall down.

In this invention; in the system which is based on this applied method has some differences and superiorities which are explained in details below compared to Recot Inc.'s patent in the USA with no. 5.433.060.

a) As mentioned in Recot's claim no.1 , the sealing of the packages on the strip under pressure and heat is not a recent invention, because announcements for promotion have been made ever since by sealing strips onto packages. A similer application can be seen in case of potato and fruit bags.

b) It's known by those who know the subject well that the loosening of the joining parts and different wearing might cause serious problems because there is a mechanical damage on every package made in jaws which are constantly warming and cooling and the additional parts are not rigid. This will bring some disadvantages as below.

- When the additional part gets loose, the sealing of the strip or the package gets very strong and the packages can hardly be separated from the strip, therefore the package, the strip and the system of hangings might be damaged; or when the sealing is too loose the packages might be dropped by the wind or another effect.

c) In feeding the strip, as Recot suggests, a step motor or a pneumatic system should be used; in other words there is a system pushing the strip by certain steps. In our invention, the strip is prepared with a system that has a function of positive pulling by means of bellowed pitch piston assembled on a small jaw group. Therefore there is no need for the step motor and the necessary micro processor commanding it an electronic circuit anymore. (likePLC)

d) As seen in Recot's patent in question FIG.5 Pos N1 and N2, there is a risk of ripping the package open as a result of pulling downwards. To prevent this, the strip should be held by the bottom side and the package should be lifted up, but it is not usually practised, also a shaking movement made to rip the packages off the strip may cause the other packages to free from the pawl. However, in our invention, as shown in FIG.5 Pos.01 and 02, because the packages are adversely twisted on the strip, they are not sealed on the adhesive part but pulled downwards. As a result the procedure which the consumer follows is not a kind of ripping but releasing the packet from the strip.

There for the packages could simply be released from the strip without damaging the package, the strip and the system of hangings.

e) The strip should be cut into certain lengths so as to be placed successively in a row.

In Recot's patent, since there are not any measures taken for this operation, the product should be counted by a worker before cutting. In this invention, however, the required number of packages are automatically cut after being attached on the strip and then reaches the worker who places the strips in cases and sends them to the store for the purpose of being delivered to outlets.

2.c. The Technical Problems Which The Invention Aims To Solve And Secondary Goals

With this invention, the stripping process that is mentioned at the item 2-e is carried out automatically and brings a solution for the following problems.

a) A great number of workers work on the packing area which is quite narrow and uncomfortable .

b) The workers who work at the machines repeat a monotonous and boring action thousands of times.

c) The cardboard which is still consumed as strips is first prepared, obtained and then produced.

- d) During the process from production to delivery (unloading-storing- transfer- unloading- storing- loading etc.) packages slip out of cardboard strips (FIG.5 Pos. M1, M2) at the point where strips are locked by hand due to external factors such as vibration and bumps and they scatter.
- 5 e) At the point where it is presented to the consumer, the packages become loose and fall due to external factors such as wind, bumps, knocks.
- f) While the packages produced automatically with similar method by Recot patent are shaked or pulled out of the strips. There is a high risk of damage to the strips and the system of hangings. The difference is clearly noticed at FIG. 5 POS. N1, N2 and FIG. 6 POS. a0, a1, a2, and a3.
- 10 g) In Recot Patent (which recent devoloped patent at this subject), since the strip produced gets continuously longer, the cutting process of packages containing desired number of pieces (like 10 each) is not automatic.
- h) Stripping process can be started by using signals on the original circuit of the bagmaker, in a way that there is no need for a complicated system such as with step motor or micro processor (or with PLC) . Hence, the cost is low and there is no complexity.
- 15

2.d. Brief Description Of The Drawings

Figure No	Pos.No	Description
1	10 11-a 11-b 11-c 11-d 12 13 14 15 16-a 17 18-a 18-b 19 20 40 41 42-b Station-I Station-II	A schematic side elevational view of vertical form fill and seal packaging machines with two different application of present invention A vertical type form fill packing machine The mechanism to which package reel is connected Package reel The packing material disengaging from package reel and moving on to be formed into a package The rolls directing the packing material disengaged from the reel The unit to print data/code onto the packing material The tube former Vertical jaw Driving belt system that regularly leads the packing material to the jaws. The half-made package (tube-shaped) of packing material. Packing main jaws group The mechanism which the strips are connected to strip reel Stripping reel The counter weight that presents the disengagement of stripping reel The first main part at the station -II The conveyor which carries the stripped packages out The stripped strip The stripped package The station at which the packing process is performed. The station at which the stripping process is performed.
2	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	A perspective view of the moment when grippers caught the package. The first main part at the station-II The strip material The strip braking piston The strip pitch piston The guiding part (chute) which directs the strip material. The small back strip seal jaw piston to which jaws sealing the packages to strip is connected The small front strip seal jaw piston to which the jaws sealing the packages to strip is connected. Front and back small strip seal jaws which attach the packages to the strips. Strip cutting piston Strip cutting knife The second main part at the station II. The piston which carries the packages from the 1st station-I to the station-II The forked arm which carries the package from the station-I to the station-II station. The pneumatic grippers Sensor The plate which the sensor perceives (31) The fixing profile which attach piston (31) to to the second main part (30)
3	Station-II	Perspective view of the moment when the package is attached to the strip at the station-II
4	20 30 24 32 36	The 1st main part at the 2nd station to which pitch braking and other parts are attached. The second main part to which the piston that the pneumatic grippers, arms carrying the packages from the station-I to the station-II are connected to is attached. The guiding part which makes the strip lead to sealing jaws The forked part to which pneumatic grippers are attached Percalving plate for sensor
5	M1 M2 N1 N2 O1 O2	Front elevational view of specially perforated cardboard strip Side elevational view of the packages are manually attached to strip. Front elevational view of the stripped packages made by Recot's patent. Side elevational view of the stripped packages made by Recot's patent. Front elevational view of the stripped packages made by present invention. Side elevational view of the stripped packages made by present invention.
6	a0 a1 a2 a3	The phases of detaching the packages from the strips produced with the stripping method and by the stripping unit that is the subject matter to the patent.

2.e. Description of Background Art.

This invention related generally to system for attaching (affixing) bags to a carrier strip, especially, to a method and apparatus for detachably securing flexible bags to a display carrier strip and simultaneously affixing at the second station.

- The packing machine producing the package is illustrated in the figure 1, but the principal operating system (there are machines that have pneumatic, mechanic, hydrolic, rotatory, electro-pneumatic, electro-mechanic or electro-hydrolic operating system) is already known by the science of packing technology; thus, the details will not be defined again when explaining this invention.

- Sealing of the upper and lower ends of the packages in the horizontal and vertical type form filling and sealing packing machines is carried out and cut by the same jaw group (17). Sealing of the back parts is carried out by back jaws (14) in the vertical types and in the horizontal types the same process is performed while the package is going through 2-3 jaw groups with rotatory disks, thus the packet one end of which is sealed and the other is open like a tube (16) is ready before the product is put in.

- How to produce a small number of packages and meanwhile the application of the invention is explained below;

- Packing machines (10) have stripping reels (18-b) near the mechanism (11-a) in which normal package reel (11-b) is located.

- While packing material starting from the package bobbin is going through various (directing) rolls (11d) off center and information such as date of code is checked and printed automatically (12), afterwards the packing material goes through a special tube former and then while this material being wrapped around a pipe in accordance with the sealing method is being pulled by the jaw, it is applied to the jaws as much as the length of the package by means of frictional and vacuumed belts in the machines of some certain types.
a) Stripping bobbin is placed in the spare bobbin (18a) pin of the machine. Here, a strip having a counter weight part (19) is used in order to prevent the bobbin from turnover because of the speed inertness that occurs during operation.

b) On the first main and horizontal part are connected the braking piston (22), stroke (pitch) piston (23) and the pistons to which the sealing jaws are connected (25,26) strip leading (directing) roll and guide shuttle (24). The knife cutting the strip at certain lengths (by the signal it perceives) (29) and the piston to which it is connected are also connected to this part.

c) On the second main and vertical part (30) (which canbe installed two different way see fig.1) - shown in Figure 4-are connected the pneumatic grippers (33) that hold the package of which all sealing proceses are completed in the big main jaws along with the group of armed bars (32) to which those pneumatic gripper are connected, and the pneumatic piston (31) which causes the armed bar system to move up and down with the signal it perceives and the sensor that enables the piston to complete the cycle by making use of the position of the pneumatic piston while it is going through a certain point, and the plate (35) enabling the sensor to be perceived.

d) The package (16-b) weighed, filled and sealed at the top, bottom and back by the packing machine is held by the two reciprocal pneumatic grippers (33) of the system that is the subject matter of the patent, and is rapidly carried to the second station (this is the point where the packages are sealed to the stripe). While it is being carried Sensor (34) produces a signal by perceiving plate (35) which is connected to the arm (32) and by which the package comes down, and sends this signal to the pneumatic system which moves the sealing jaws (27). The valves receiving the signals open the sealing jaws connected to the pistons are (26) and so the pistons are put into motion. At the end of this process, the package is ready to be attached to the stripe. (The figure on Page 3).

- When the jaws (27) attach the package to the stripe, finger shaped clasps (33) are opened and they rapidly go up to the first station with their arms open in order to hold a new package.

- When they reach the first station the arms are still open. The jaws at the first station perform the sealing process, and during the cutting process the pneumatic clasps are closedby the signal coming from this processand hold the package . While the sealing jaws are opening the system carries the package to the second station During the time the

package is being carried down, the sensor sees the perceiving part and gets the sealing jaws to move. Thus the cycle goes on.

5 - While the jaws are coming forward, brake piston (22) is open and it allows the stripe to pass below. However, the pitch piston (23) is closed during that time. That is; the piston compresses the stripe so that its position is not displaced. Nevertheless, the jaw (27) to which the piston is connected has pulled with it as much stripe (21) as the distance way it covers while coming forward. This length is equal to the space (p) between the packages on the stripe. (It is called "pitch")

10 - While coming back after sealing, the braking piston(22) is closed and the pitch (step) piston (23) is open, so when the pitch piston comes forward the stripe is pulled as much as a step (p) and its position is fixed so that it can not move back-thus the the step remains unchanges. Meanwhile, the packages (42-b) on the prepared stripe stretch the stripe and keep it streched by gravity.

15 - The process continues as mentioned. During those processes the package (16) is filled with the product weighed on the electronic scale located on the packing machine or it can be filled (fed) by hand.

20 The packages (42-b) which sealed (bottom, top and back) at the first station of the packing machine are automatically attached to the stripes (21) at the second station by armed clasps (33) and after being cut at certain lengths, they are poured upon the conveyor belt beneath the packing machine and with the help of the conveyor (40) the striped packages are taken out to be put into cases. Packages in cases are sent for shipping to be supplied to the market.

3. CLAIMS

- 5 1- Stripping the packages, produced by vertical or horizontal type fill and seal packing machines having on a carrier display strip at a second station of the same machine using the sealing method of applying heat pressure in order to attach them so that the packages themselves, the display strip and the system of hangings will not get damaged.
- 10 2- Apparatus as defined in Claim 1 the sealing method of applying heat and pressure to the package as shown in the figure on FIG.5 Pos. 01-02, which is the most characteristic of our invention -by means of this invention packages produced by vertical or horizontally type form fill and seal packing machines that have the ability to be adhered more safely, and more easily detached than those produced by other available systems and the packages themselves, the strip or the system of hangings are not damaged.
- 15 3- Apparatus as defined in Claim 1 the method of feeding the strip from opposite the small stripe seal jaw located on the opposite side of the vertical jaw (or back sealing disk can do job of vertical jaw on the horizontal type machines.) at the second station in order to have the condition mentioned in Item 2 above realized.
- 20 4- An apparatus according to claim 2, where in one of two strip sealing jaws, includes a guiding chute with bar and the carrier strip passes trough the chute on the strip sealing jaw to a location adjacent an end of a package.
- 25 5- Apparatus as defined in Claim 1, the matter that the strip is able to be pulled by means of natural motion of the jaw with a direct positive effect from the system at the second station to which small strip sealing jaws and pitch piston are connected each other. (The type of the braking piston and pitch piston;mechanic, vacuumed, diaphragm, disk driver doesn't change the essence of the system.)
- 30 6- Apparatus as defined in Claim 1, the matter that the machine can perceive signals from the normal electric system so the system can be operated without needing an extra control system (PCL, or microprocessor etc.)
- 35 7- An apparatus according to Claim 1, where in at least one pair of strip seal jaw is of a plurality of mating seal elements (strip) at station-II.
- 40 8- An apparatus according to Claim 2, wherein said seal-forming means includes a pair of sealing jaws for forming the top and bottom seals of adjacent packages.
- 45 9- An apparatus according to Claim 4, where in one of the strip sealing jaws of said-seal-forming means includes a guiding chute with bar theretrough for feeding the carrier strip therethrough and against a package (to front side of package.)
- 50 10- Apparatus as defined in Claim 1, the process in which the strips, are cut at certain lengths (when a certain number of packages are placed) after the packages are attached to the strips in order to be cased.
- 11- The method by which the strip bobbin is installed at the side where the other main bobbin is located.
- 12- The method by which the stripped packages are carried to the back side of the machine by a mobile conveyor belt passing beneath the machine. As a result, it becomes easier to reach the heated parts that need servicing frequently and reaching gets easier as well.
(However; whether conveyer belt (40) used for the purpose of transportation takes away the packages/strips from the front, back, left or right sides of the machine doesn't effect the essence of this patent.)
- 13- The method of attaching the package by means of small jaws located at the second station which is situated at the opposite side of the sealing performed by the vertical back jaw (the back sealing disks in the horizontal type machines) for the method of attaching at FIG. 5 Pos. 01 and 02 .

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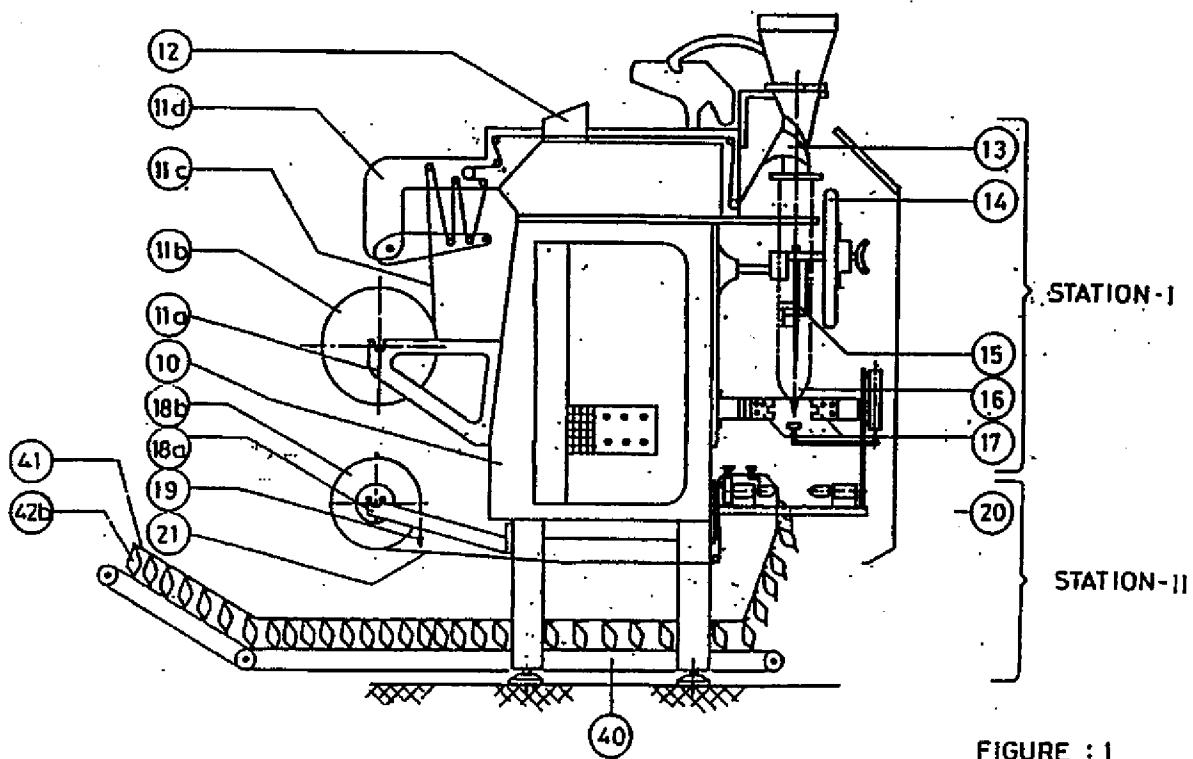
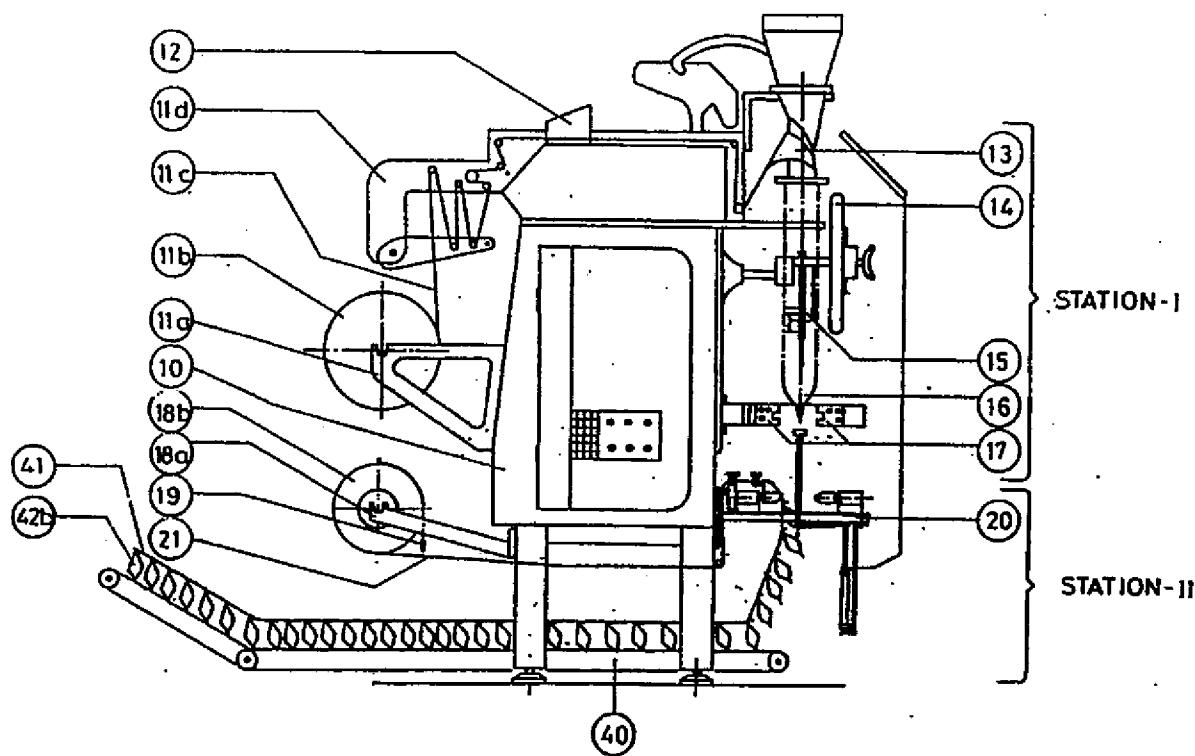


FIGURE : 1

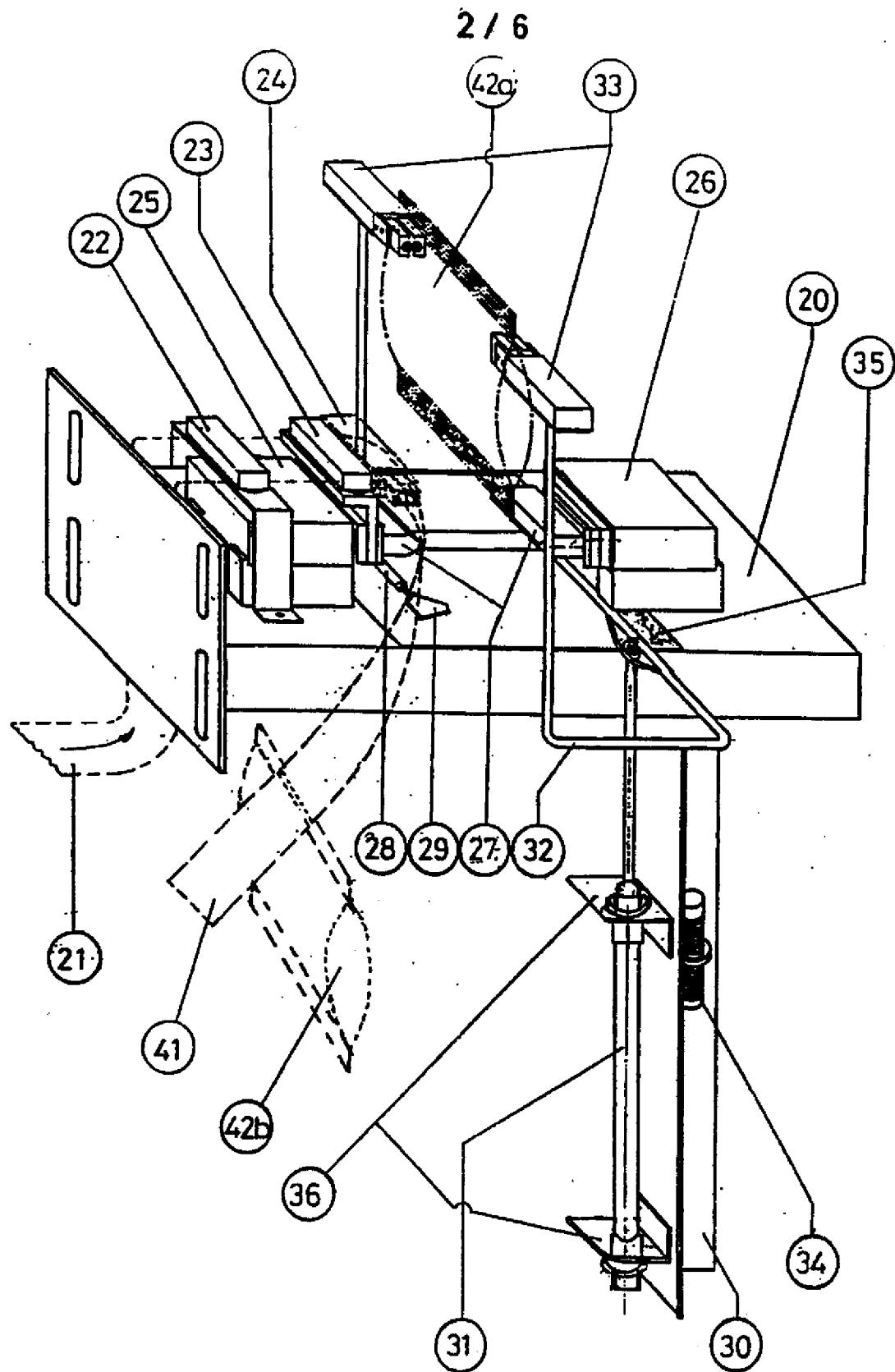


FIGURE : 2

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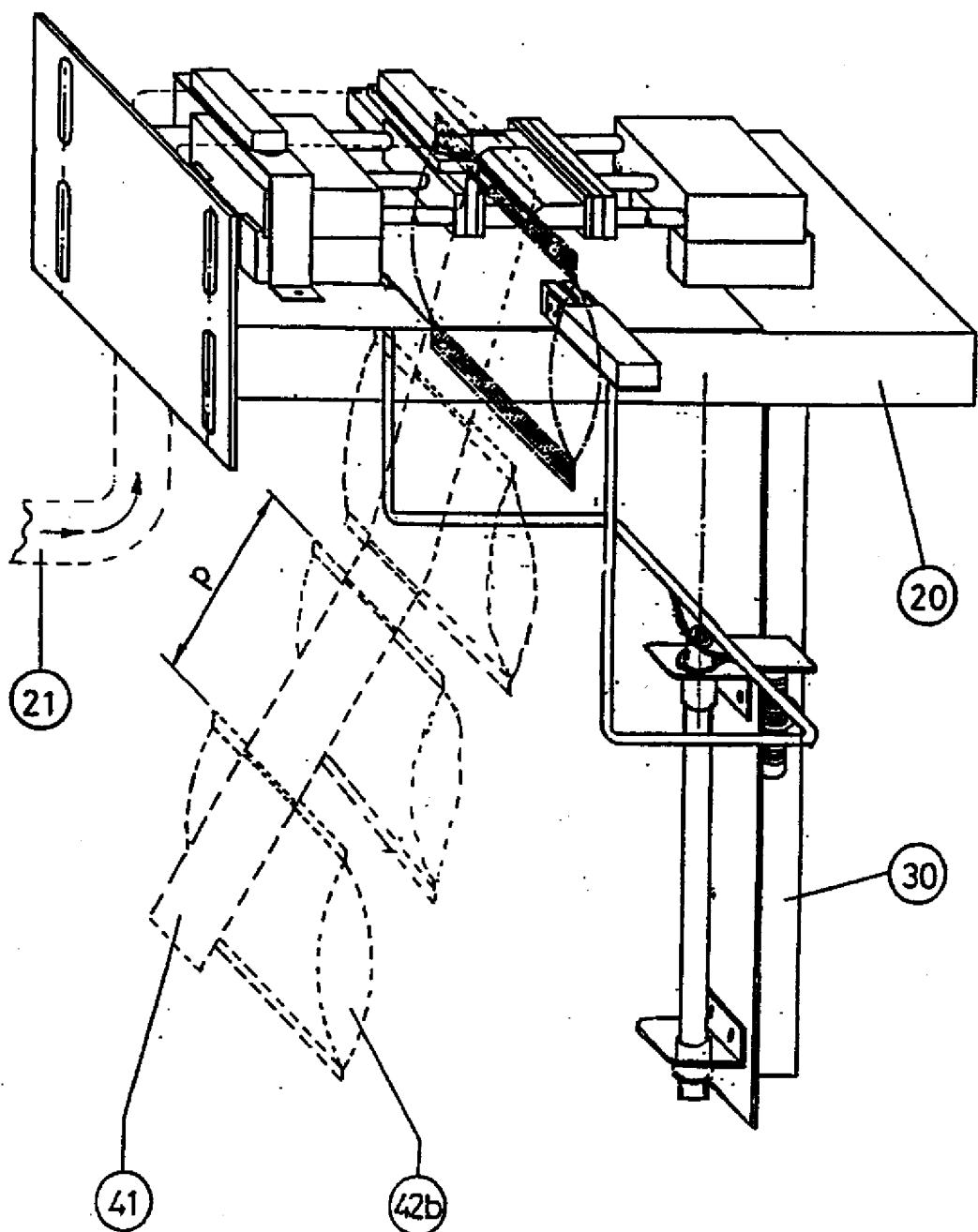


FIGURE : 3

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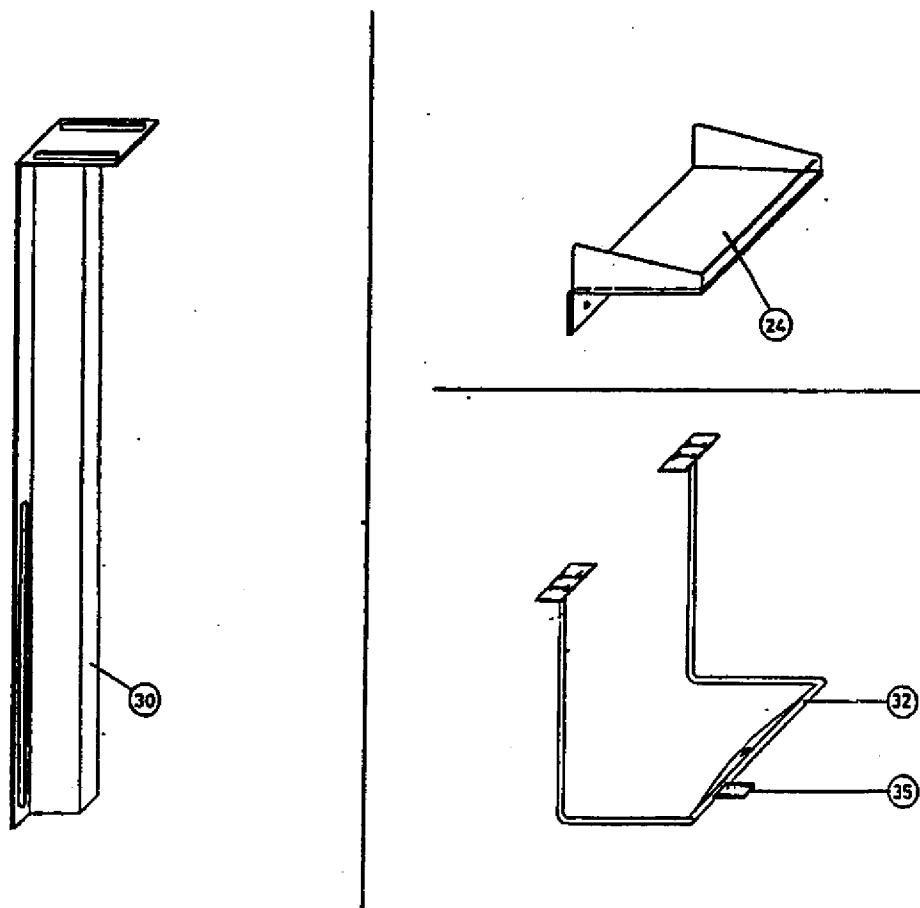
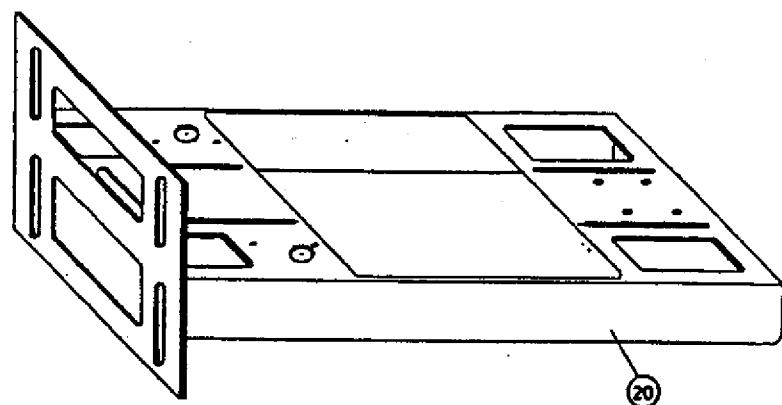
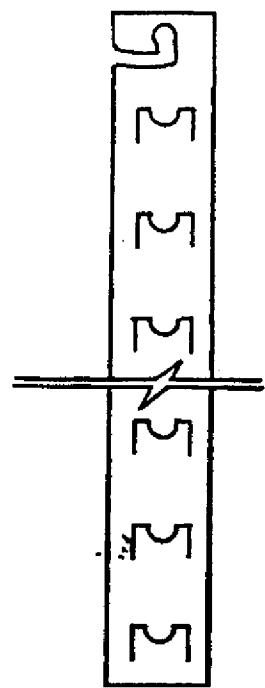


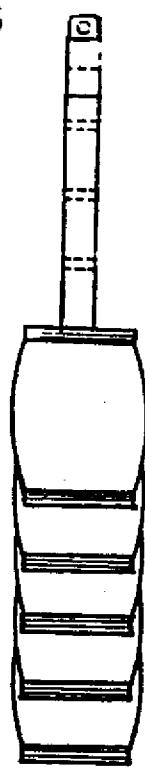
FIGURE : 4

M1

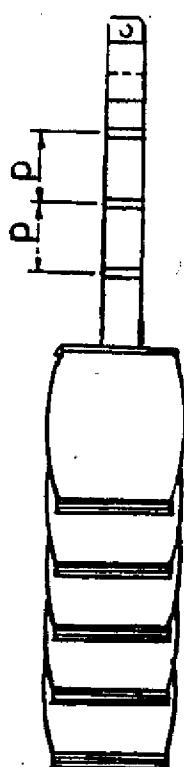


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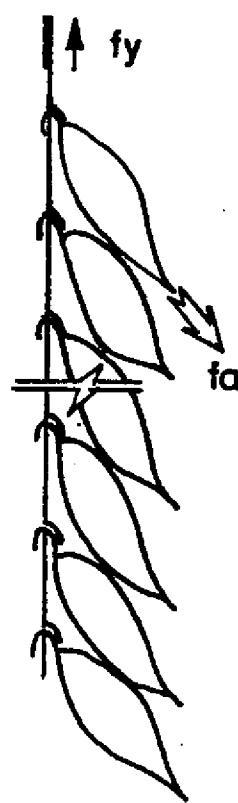
N1



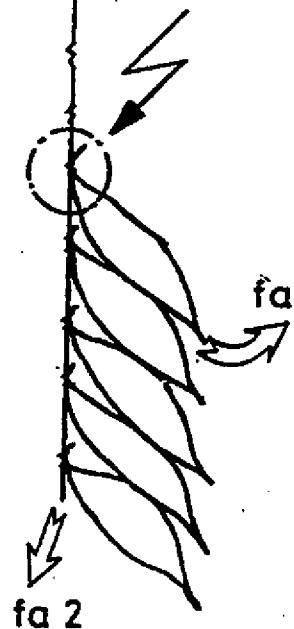
01



M2



N2



02

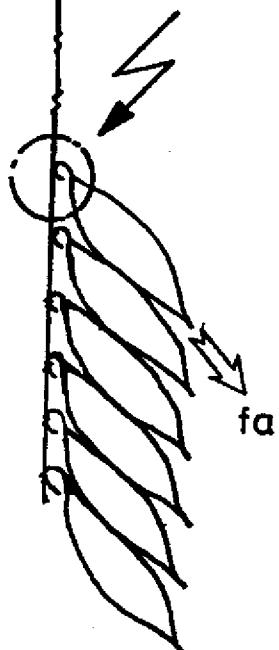


FIGURE :5

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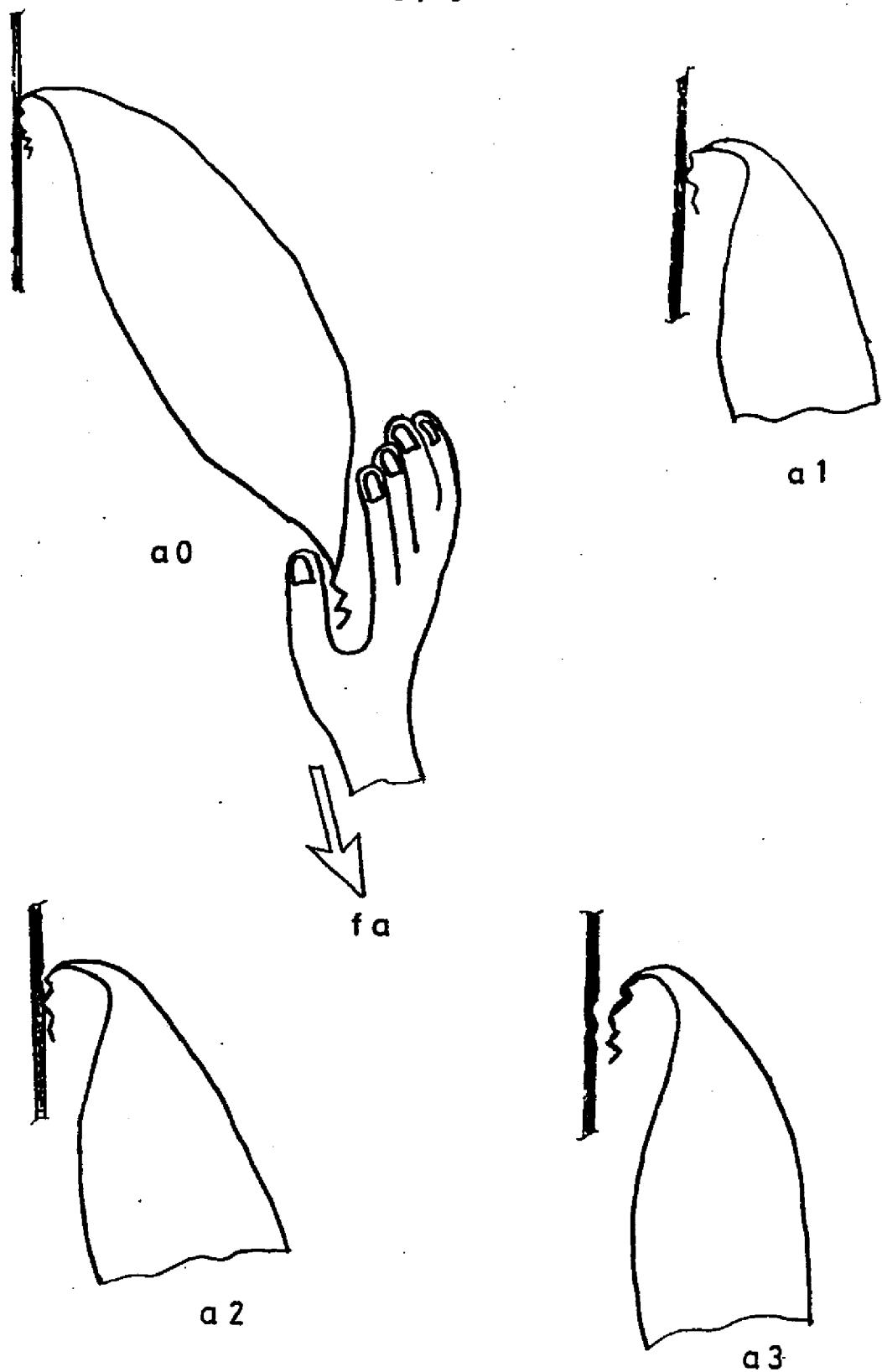


FIGURE:6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR 97/00011

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁶: B 65 B 15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁶: B 65 B 15/00; B 65 D 73/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 864 895 A (PETREA) 11 February 1975 (11.02.75), especially column 4, lines 47-68 (cited in the application).	1-13
A	US 5 433 060 A (GUR et al.) 18 July 1995 (18.07.95), (cited in the application).	1-13

<input type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
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Date of the actual completion of the international search 29 January 1998 (29.01.98)	Date of mailing of the international search report 05 February 1998 (05.02.98)
Name and mailing address of the ISA/AT AUSTRIAN PATENT OFFICE Kohlmarkt 8-10 A-1014 Vienna Facsimile No. 1/53424/535	Authorized officer Metzger Telephone No. 1/53424/355

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International application No.

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In Recherchenbericht angeführtes Patentdokument Patent document cited In search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
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**(54) AUTOMATED METHOD AND APPARATUS FOR DETACHABLY SECURING FLEXIBLE
PACKAGES TO A DISPLAY STRIP**

AUTOMATISIERTES VERFAHREN UND VORRICHTUNG ZUM LÖSBAR VERBINDELN VON
FLEXIBLEN VERPACKUNGEN AUF EINEM ANZEIGESTEIFEN

PROCEDE ET APPAREIL AUTOMATISES DESTINES A FIXER DE MANIERE AMOVIBLE DES
EMBALLAGES SOUPLES SUR UNE BANDE DE PRÉSENTATION

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Description**BACKGROUND OF THE INVENTION****Field of the Invention**

[0001] The present invention relates generally to systems for affixing packages to a carrier strip and, more particularly, to a method and apparatus for detachably securing flexible packages to a display carrier strip and simultaneously forming a sealed end of each package.

Description of Background Art

[0002] It is known in the art to form flexible packages of various products, e.g., snack food products, and affix the packages to a carrier strip which may be displayed in a grocery store or the like. The customer can remove a package from the carrier without damaging the package, i.e., without adversely affecting the sealed condition of the package. One of the primary attributes of such display strip systems is their suitability for use in a retail establishment with limited space. The display strips are considerably smaller than conventional product display racks, which racks may not fit in particular establishments due to space limitations or may not be justified in view of limited sales volume. The display strip and attached packages require little space and may be positioned on a counter or other suitable support.

[0003] U.S. Patent No. 3,864,895 discloses a bag forming, filling, and sealing machine for producing small packages of a product adhesively secured to a backing sheet.

[0004] U.S. Patent No. 4,422,552 to Palmer et al. and U.S. Patent No. 4,476,619 to Palmer disclose methods and apparatus for folding the end seal or flange of a bag into the slot of a display card. The steps of folding and tucking the end seals of numerous packages into a slotted display card are often performed manually and consume considerable time and expense. The prior art, however, includes alternative methods of attaching flexible packages to a display card.

[0005] For example, U.S. Patent No. 2,272,623 to Runner discloses a display card with packages removably attached thereto by adhesive. In U.S. Patent No. 4,003,782 to Farrelly, manufactured bags are applied to two lines of pressure sensitive adhesive and then stored in a carton or the like. It is also known to attach empty packages to a display or mounting support base and then fill and seal the packages. See U.S. Patent No. 3,331,182 to Hannon. Several problems arise with the aforementioned methods of securing packages to a display strip. One problem that often occurs when the packages are adhesively attached to the display strip is that the packages cannot easily be removed from the strip without damaging the sealed condition of the packages. Additional problems arose in attempts to automate the attachment of the carrier strip to the flexible

packages due to the limited space available below the sealing jaws of a conventional bagmaking apparatus. In other words, there was little or no room below the seal jaws to accommodate automatic attachment equipment.

[0006] It is apparent that there is a need in the art for a method and apparatus for removably securing flexible packages to a display strip which are free of the problems present in prior art systems.

SUMMARY OF THE INVENTION

[0007] The present invention provides a method and apparatus for detachably securing flexible packages to a display carrier strip while simultaneously sealing an end of each package. In its preferred form, the present invention includes a novel sealing jaw assembly which permits the display carrier strip to be fed therethrough into close proximity with the package preform. The sealing jaws place a transverse seal in the package preform which forms the top seal of a filled package extending below the jaws, and the bottom seal of an empty package extending above the jaws. The top seal of the filled package is detachably secured to the carrier display strip simultaneously with the forming of the transverse seal. The continuous display strip and attached packages then may be transported by a suitable conveyor device to a packaging area or the like and prepared for shipment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Additional features and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a somewhat schematic view of an automated assembly apparatus for detachably securing flexible packages to a display strip;

FIG. 2A is a perspective view of a sealing jaw according to the present invention;

FIG. 2B is an end elevation view of the sealing jaw shown in FIG. 2A looking in the direction of arrows b-b in FIG. 2A;

FIG. 2C is a sectional view of the sealing jaw shown in FIG. 2A looking in the direction of arrows c-c in FIG. 2A;

FIG. 3A is an enlarged view of the encircled portion in FIG. 1;

FIG. 3B is a front elevational view of the portion shown in FIG. 3 looking in the direction of arrows a in FIG. 3;

FIG. 4A is a front elevational view of the finished display strip and attached packages;

FIG. 4B is a side elevational view of the display strip and attached packages shown in FIG. 3A; and

FIG. 4C is a front elevational view of the display

strip and attached packages shown in FIG. 3A with some of the packages removed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] Referring to FIG. 1, an automated apparatus for detachably securing flexible packages to a display strip is indicated generally by the reference numeral 10. A bagmaking apparatus, e.g., a vertical form, fill, and seal apparatus (VFFS), is shown schematically at 12. Bagmaking apparatus such as VFFS machines are known in the art and will not be described in detail in the present application.

[0010] Bagmaking apparatus 12 forms packaging material into package preforms which are advanced in consecutive fashion through the apparatus 12. In particular, a preform is transversely sealed by sealing jaws at a sealing station disposed below the filling tube of the bagmaking apparatus. The seal constitutes the top edge of a filled package extending below the sealing station and the bottom edge of a yet to be filled package extending above the sealing station. A knife mechanism cuts the preform at the transverse seal to separate same into two separate packages; the lower package being filled and sealed at both ends and the upper package being empty and sealed at its lower end. After separating the packages by cutting the transverse seal on the preform, the empty package is advanced and filled to bring its top edge to the sealing station where it is sealed and separated from the next package, i.e., the package now extending above the sealing station.

[0011] The sealing station is indicated generally at 50 in FIG. 1 and includes sealing jaws 52, 53 for forming the aforementioned transverse seals. A lower sealing assembly for removably attaching the packages to the display strip is indicated generally at 60 in FIG. 1 and includes lower sealing blocks or bars 62, 63. As best seen in FIGS. 2A-2C, lower sealing blocks or bars 62, 63 preferably are respectively secured to sealing jaws 52, 53. Sealing jaw 52 has a cut-out portion 66 which defines a slot 68 extending through the jaw for reasons that will be described below.

[0012] With attention directed to FIG. 1, a supply reel 14 of display carrier strip material has a strap web 18 extending therefrom toward bagmaking apparatus 12. A reel friction brake 16 controls the speed of rotating supply reel 14. The display carrier strip is preferably manufactured from a material that is flexible but yet stiff enough to support a plurality of packages as seen in FIG. 4A which shows the final product. The display strip material is selected so that it does not melt and/or deform before the attachment of the packages to the strip, i.e., as the strip is fed through the sealing jaw which typically reaches 375°F during operation. For example, the display carrier strip may be manufactured from suitable plastic materials, such as paper laminated to coextruded metalized polyethylene to 40 micron

polypropylene.

[0013] The carrier strip web 18 passes from supply reel 14 to a strip drive mechanism indicated generally at reference numeral 30 and enclosed in circle I in FIG. 1. The strip drive mechanism 30 advances carrier web 18 in a controlled manner relative advancement of the package preforms. The strip drive mechanism 30 can be any device which suitably advances the carrier strip web 18 through the sealing station 50, 60.

[0014] [0014] The circled portion I of FIG. 1 is enlarged in FIGS. 4A and 4B and shows a preferred embodiment of a strip drive mechanism 30 that includes a stepper motor 32 having a shaft 34 which drives a stepper wheel 36. The stepper wheel 36 rotates to advance strip web 18 into an elongated slot formed in sealing jaw 52 as described in detail below. A back-up roller 38 is disposed next to stepper wheel 36 and the strip web 18 passes between the back-up roller 38 and the stepper wheel 36. The back-up roller 38 may be rotatably mounted on a bracket 40 as shown in FIG. 3B. The stepper motor can be precisely controlled to permit the carrier strip web to be properly positioned relative the package preforms advanced by the bagmaking apparatus. In addition, the strip drive mechanism 30 can be programmed such that the stepper motor 32 will be automatically controlled, e.g., by a microprocessor. The stepper wheel preferably includes a rubber wheel having, e.g., a 2 inch diameter and a 3 inch width. The rubber wheel frictionally engages the strip material web 18 and cooperates with back-up roller 38 to advance the web.

[0015] Those skilled in the art will recognize, of course, that means for advancing the carrier strip web other than the above-described stepper motor may be used. For example, an air cylinder device which advances the strip web with air powered mechanical movements may be used in lieu of the stepper motor mechanism.

[0016] With attention directed to FIGS. 2A-2C, sealing jaw 52 of sealing station 50 and sealing block 62 of lower sealing assembly 60 are shown therein in detail. Sealing jaw 52 includes an upper sealing portion 54 and a lower sealing portion 56 separated by a groove 58. The groove 58 extends a limited distance from adjacent the outer surface of sealing portions 54, 56 into the interior of sealing jaw 52. See FIG. 2C. Groove 58 preferably contains a knife mechanism (not shown) which severs the package preform into a lower filled package and an upper empty package as described above. Specifically, upper sealing portion 54 forms the lower transverse seal of the upper package and lower sealing portion 56 forms the upper transverse seal of the filled lower package. After the knife mechanism separates the packages, the upper package, the bottom edge of which now has been sealed, may be filled and advanced downward, wherein further actuation of the sealing jaws 52, 53 seals the top of the same package. [0017] The present invention attaches the filled sealed

packages to the display strip 18 simultaneously with the forming of transverse seals as described above. Attached to the sealing jaws 52, 53 by any suitable means are, respectively, sealing blocks 62, 63 of lower sealing assembly 60. As seen in FIGS. 1 and 2C, display carrier web 18 passes from take-up spool 20, past strip drive mechanism 30, through sealing jaw 52, and into engagement with the package. For this purpose, sealing jaw 52 is provided with an elongated slot 68 extending therethrough. A cut-out portion 66 of sealing jaw 52 cooperates with sealing block 62 to define slot 68. In particular, sealing block 62 preferably is secured to sealing jaw 52 so as to cover cut-out portion 66. See FIG. 2B. Sealing block 62 also preferably has a width that is slightly greater than the width of cut-out portion 55 but less than the overall width of sealing jaw 52.

[0018] Lower sealing blocks 62, 63 have mating seal elements 64 disposed thereon as best seen in FIGS. 2A and 2B. The sealing elements 64 of each block 62, 63 are aligned so as to engage each other when the sealing jaws 52, 53 are brought together. The display carrier strip web 18 passes into slot 68 of sealing jaw 52 and then downward from the slot over the sealing elements 64 of sealing block 62. See FIGS. 1, 2A and 2C. This positions the display carrier strip 18 in close proximity with the unsealed top edge of a filled package 72, shown in phantom in FIG. 1. In addition to sealing the top edge of the filled package 72 (and the bottom edge of an overlying empty package), actuation of the sealing jaws 52, 53 detachably secures the top edge of filled package 72 to the display carrier strip 18.

[0019] Lower sealing blocks 62, 63 preferably have a plurality of sealing elements 64 disposed thereon which secure the filled package to the display carrier strip 18 at locations corresponding to the position and number of sealing elements 64. In a preferred embodiment, three sealing elements 64 are included on each sealing block 62, 63. However, those skilled in the art will recognize that different numbers and configurations of sealing elements may be used without departing from the present invention.

[0020] Sealing blocks 62, 63 heat-seal the top edge of the filled package to the display carrier strip 18 upon actuation of the sealing jaws 52, 53. The sealing elements 64 securely affix the package to the strip 18 such that the package may be easily removed from the carrier strip without damaging the sealed condition of the filled, sealed package. The material from which display carrier strip 18 is formed adheres to the packaging material by point heat and pressure applied by sealing blocks 62, 63. Thus, the actuating motion of sealing jaws 52, 53 seals the top edge of the filled package and seals the package to the display carrier strip. This arrangement greatly simplifies the overall procedure and is a significant improvement over prior art systems.

[0021] The carrier strip 18, with the filled, sealed packages 70 attached thereto, is carried by a conveyor mechanism 80 to a location where the strip and pack-

ages are prepared for distribution. The flexibility of the display carrier strip permits the same to be case packed with the packages attached thereto for easy storage and/or transportation.

[0022] FIGS. 4A-4C show a display strip produced according to the present invention and having a plurality of packages secured thereto in removable fashion. The display carrier strip 100 includes an adhesive hanger member 110 which serves to secure the entire assembly to a suitable support surface. Of course, any other support or hanger means may be used. The strip 100 has packages 120 removably attached thereto by heat seal connections 130 formed by the strip seal bars or blocks 62, 63 as described above. FIGS. 4A and 4B show a display carrier strip 100 fully covered with packages 120. FIG. 4C shows the product display strip of FIGS. 4A and 4B with several packages removed. The releasable heat seal connections 130, which permit removal of the packages 120 without damaging their sealed condition, are visible on the portion of the display carrier strip 100 from which packages have been removed.

[0023] It is apparent that the method and apparatus of the present invention permit the removable attachment of filled, sealed flexible packages to a display carrier strip without the problems present in prior art systems. The attachment of the packages to the display carrier strip is carried out using the existing motion of the sealing jaws which form the top and bottom edge seals of each package. A precisely controlled strip drive mechanism cooperates with the sealing jaws to eliminate prior art problems in package control and positioning. Moreover, the attachment mechanism for securing the packages to the carrier strip is greatly simplified over prior art systems. Consequently, the present invention significantly reduces manufacturing cost compared with conventional package attachment systems.

[0024] The features and advantages of the present invention will readily occur to those skilled in the art, as will many modifications and alterations in the preferred embodiments of the invention described herein, all of which may be achieved without departing from the spirit and the scope of the invention as defined by the appended claims.

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Claims

1. An apparatus for manufacturing a plurality of sealed packages (70) which are detachably secured to a display carrier strip (18), the apparatus comprising:

50 a bagmaking device (12) for forming a package preform, the preform configured to receive product;
55 a sealing station (50) disposed adjacent said bagmaking device (12), the sealing station (50) including sealing jaws (52,53) for forming a transverse seal across the preform to form a

- top seal of a filled package extending below the sealing station (50) and a bottom seal of a package to be filled extending above the sealing station (50);
 the apparatus characterized in that it further comprises:
 a strip drive device (30) for feeding a continuous, sealable carrier display strip (18) to a location adjacent the sealing station (50); and
 at least one strip seal bar (62) for detachably securing an end of each package to the carrier display strip (18) simultaneously with the sealing of an end of the package by the sealing jaws (52,53);
 whereby filled sealed packages (70) are secured to the carrier display strip (18) and can be removed therefrom without damaging the sealed condition of the packages.
2. An apparatus according to claim 1, wherein one of said sealing jaws (52) includes a slot extending therethrough and the carrier strip (18) passes through the slot to a location adjacent the package end to be secured to the carrier display strip (18). 20
3. An apparatus according to claim 2, wherein the slot is defined between said at least one strip seal bar (62) and a cut-out portion (66) of said one of said sealing jaws (52). 25
4. An apparatus according to any preceding claim, wherein a first strip seal bar (62) is secured to a first sealing jaw (52) and a second strip seal bar is secured to a second sealing jaw (53), and wherein activation of said first and second sealing jaws (52,53) to form the transverse package seal activates the first and second seal bars to removably secure a package to the display carrier strip (18). 30
5. An apparatus according to any preceding claim, wherein the strip drive device (30) includes a stepper motor (32) and a stepper wheel (36), and the stepper motor (32) rotates the stepper wheel (36) to controllably advance the display carrier strip (18) toward the sealing station (50). 40
6. An apparatus according to any preceding claim, further comprising:
 means for separating adjacent preforms along the transverse seal to form the bottom and top seals of packages extending, respectively, above and below the sealing station.
7. A method of manufacturing a plurality of filled, sealed packages which are removably secured to a continuous carrier strip (18), the method comprising steps of:
 forming a series of package preforms, each of which is configured to receive product from a product supply source; and
 for each preform, forming at a sealing station (50) a transverse seal across the preform to form a top seal of a filled package extending below the sealing station (50) and a bottom seal of a package to be filled extending above the sealing station (50);
 the method characterized by further comprising the steps of:
 choosing said carrier strip of a sealable material;
 positioning said continuous sealable carrier strip (18) adjacent the package preforms; and simultaneously with forming the transverse seal, detachably securing the top of the filled package to the carrier strip (18) by moving the top of the filled package against the display carrier strip (18) and removably joining the top seal of the filled package to the carrier strip (18).
8. A method according to claim 7, wherein sealing of the preforms at the sealing station (50) is performed by sealing jaws (52,53) which simultaneously detachably secure an end of the filled package to the carrier strip (18). 45
9. A method according to claim 8, wherein one sealing jaw (52) includes an opening through which the carrier strip (18) can be passed, the method further comprising passing the carrier strip (18) into close proximity with the package preform and detachably securing the package preform to the carrier strip by the sealing jaws (52,53).
10. A method according to claim 9, wherein the display carrier strip (18) is advanced through the opening in the one sealing jaw (52) and toward the sealing station (50), by rotating a stepper wheel (36) of a strip drive device (30) by means of a stepper motor (32) of the strip drive device (30).
- Patentansprüche**
1. Vorrichtung zum Herstellen einer Anzahl von versiegelten Packungen (70), die an einem Trägeranzeigestreifen (18) abnehmbar befestigt sind, wobei die Vorrichtung aufweist:
 eine Beutelherstellungseinrichtung (12) zur Ausbildung einer Packungsvorform, wobei die Vorform zur Aufnahme eines Produkts geeignet ist;
 eine Versiegelungsstation (50), die neben der Beutelherstellungseinrichtung (12) angeordnet ist, wobei die Versiegelungsstation (50) Versie-

- gelungssacken (52, 53) zur Ausbildung einer Querversiegelung über die Vorform aufweist, um eine obere Versiegelung einer gefüllten Packung, die sich unterhalb der Versiegelungsstation (50) erstreckt, und eine untere Versiegelung einer zu füllenden Packung, die sich oberhalb der Versiegelungsstation (50) erstreckt, zu bilden; dadurch gekennzeichnet, daß die Vorrichtung ferner aufweist:
- eine Streifenantriebseinrichtung (30) zum Zuführen eines fortlaufenden versiegelbaren Trägeranzeigestreifens (18) zu einer Stelle nahe der Versiegelungsstation (50); und wenigstens einen Streifensiegelungsbalken (62) zur abnehmbarer Befestigung eines Endes jeder Packung am Trägeranzeigestreifen (18) gleichzeitig mit der Versiegelung eines Endes der Packung mit den Versiegelungsbalken (52,53); wodurch gefüllte versiegelte Packungen (70) an dem Trägeranzeigestreifen (18) befestigt und von diesem ohne Beschädigung des Versiegelungszustandes der Packungen abgenommen werden können.
2. Vorrichtung nach Anspruch 1, bei welcher einer der Versiegelungsbacken (52) einen sich durch denselben erstreckenden Schlitz enthält und der Trägerstreifen (18) durch den Schlitz nahe dem am Trägeranzeigestreifen (18) zu befestigenden Pakkungsende verläuft.
3. Vorrichtung nach Anspruch 2, bei welcher der Schlitz zwischen dem wenigstens einen Streifensiegelungsbalken (62) und einem ausgeschnittenen Teil (66) des einen Versiegelungsbackens (52) gebildet ist.
4. Vorrichtung nach einem der vorangehenden Ansprüche, bei welcher ein erster Streifensiegelungsbalken (62) an einem ersten Versiegelungsbacken (52) und ein zweiter Streifenversiegelungsbalken an einem zweiten Versiegelungsbacken (53) befestigt ist, und bei welcher eine Aktivierung des ersten und zweiten Versiegelungsbackens (52,53) zur Bildung der Packungs-Querversiegelung den ersten und zweiten Siegelungsbalken aktiviert, um eine Packung am Anzeigeträgerstreifen (18) lösbar zu befestigen.
5. Vorrichtung nach einem der vorangehenden Ansprüche, bei welcher die Streifenantriebseinrichtung (30) einen Schrittmotor (32) und ein Schrittschalttrad (36) enthält und der Schrittmotor (32) das Schrittschalttrad (36) so dreht, daß es den Trägeranzeigestreifen (18) steuerbar zur Versiegelungsstation (50) fördert.
6. Vorrichtung nach einem der vorangehenden Ansprüche, mit einer Einrichtung zum Trennen benachbarter Vorformen längs der Querversiegelung zum Bilden der unteren und oberen Versiegelung von Verpackungen, die sich jeweils oberhalb und unterhalb der Versiegelungsstation erstrecken.
7. Verfahren zum Herstellen einer Anzahl von gefüllten, versiegelten Packungen, die an einem fortlaufenden Trägerstreifen (18) abnehmbar befestigt sind, wobei das Verfahren die folgenden Schritte umfaßt:
- Ausbilden einer Reihe von Packungsvorformen, deren jede so geformt ist, daß sie ein Produkt aus einer Produktvorratsquelle aufnimmt; und bei jeder Vorform in einer Versiegelungsstation (50) Ausbilden einer Querversiegelung über die Vorform zur Bildung einer oberen Versiegelung einer gefüllten Packung, die sich unterhalb der Versiegelungsstation (50) erstreckt, und einer unteren Versiegelung einer zu füllenden Packung, die sich oberhalb der Versiegelungsstation (50) erstreckt; gekennzeichnet durch folgende Schritte:
- Auswählen des Trägerstreifens aus einem siegelbaren Material;
- Anordnen des fortlaufenden siegelbaren Trägerstreifens (18) nahe den Packungsvorformen; und gleichzeitig mit dem Ausbilden der Querversiegelung abnehmbares Befestigen des oberen Endes der gefüllten Packung am Trägerstreifen (18) durch Bewegen des oberen Endes der gefüllten Packung gegen den Trägeranzeigestreifen (18) und lösbares Verbinden der oberen Versiegelung der gefüllten Packung mit dem Trägerstreifen (18).
8. Verfahren nach Anspruch 7, bei welchem das Versiegeln der Vorformen in der Versiegelungsstation (50) durch Versiegelungsbacken (52,53) durchgeführt wird, die gleichzeitig ein Ende der gefüllten Packung am Trägerstreifen (18) abnehmbar befestigen.
9. Verfahren nach Anspruch 8, bei welchem ein Versiegelungsbacken (52) eine Öffnung enthält, durch die der Trägerstreifen (18) laufen kann, der Trägerstreifen (18) in enge Nachbarschaft mit der Packungsvorform geführt wird und die Packungsvorform am Trägerstreifen durch die Versiegelungsbacken (52,53) abnehmbar befestigt wird.
10. Verfahren nach Anspruch 9, bei welchem der Trägeranzeigestreifen (18) durch die Öffnung in dem

einen Versiegelungsbacken (52) und zur Versiegelungsstation (50) hin gefördert wird, indem ein Schrittschalttrad (36) einer Streifenantriebseinrichtung (30) mittels eines Schrittmotors (32) der Streifenantriebseinrichtung (30) gedreht wird.

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Revendications

1. Appareil pour la fabrication d'une pluralité d'embalages scellés (70) qui sont fixés de façon à pouvoir être détachés à une bande support de présentation (18), l'appareil comprenant :

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un dispositif (12) de formation de sac pour former une préforme d'emballage, la préforme étant configurée pour recevoir un produit ; un poste de scellement (50) disposé au voisinage dudit dispositif de formation de sac (12), le poste de scellement (50) comprenant des mâchoires de scellement (52, 53) pour former un joint transversal au travers de la préforme de manière à former un joint supérieur d'un emballage rempli s'étendant en-dessous du poste de scellement (50) et un joint inférieur d'un emballage à remplir s'étendant au-dessus du poste de scellement (50) ;

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l'appareil étant caractérisé en ce qu'il comprend en outre : un dispositif (30) d'entraînement de bande pour amener une bande (18) continue support de présentation pouvant être scellée en un emplacement adjacent au poste de scellement (50) ; et

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au moins une barre de scellement (62) de la bande pour fixer de façon détachable une extrémité de chaque emballage à la bande (18) support de présentation simultanément au scellement d'une extrémité de l'emballage par les mâchoires de scellement (52, 53) ; grâce à quoi les emballages scellés remplis (70) sont fixés à la bande support de présentation (18) et peuvent être retirés de la bande sans endommager la condition d'étanchéité des emballages.

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2. Appareil selon la revendication 1, dans lequel l'une desdites mâchoires de scellement (52) comprend une fente qui s'étend à travers elle et la bande support (18) passe à travers la fente vers un emplacement adjacent à l'extrémité de l'emballage qui doit être fixée à la bande support de présentation (18).

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3. Appareil selon la revendication 2, dans lequel la fente est définie entre ladite au moins une barre (62) de scellement de la bande et une partie (66) découpée de ladite une desdites mâchoires de scellement (52).

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4. Appareil selon l'une quelconque des revendications précédentes, dans lequel une première barre (62) de scellement de bande est fixée à une première mâchoire de scellement (52) et une seconde barre de scellement de bande est fixée à une seconde mâchoire de scellement (53), et dans lequel l'actionnement desdites première et seconde mâchoires de scellement (52, 53) pour former la jonction transversale de l'emballage actionne les première et seconde barres de scellement pour fixer de façon amovible un emballage à la bande support de présentation (18).

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5. Appareil selon l'une quelconque des revendications précédentes, dans lequel le dispositif (30) d'entraînement de la bande comprend un moteur pas à pas (32) et une roue d'entraînement pas à pas (36), et le moteur pas à pas (32) fait tourner la roue d'entraînement pas à pas (36) pour faire avancer de façon contrôlée la bande (18) support de présentation en direction du poste de scellement (50).

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6. Appareil selon l'une quelconque des revendications précédentes comprenant en outre :

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des moyens pour séparer les préformes adjacentes le long de la jonction transversale de manière à former les joints inférieur et supérieur des emballages qui s'étendent respectivement au-dessus et au-dessous du poste de scellement.

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7. Procédé de fabrication d'une pluralité d'embalages scellés remplis qui sont fixés de façon amovible à une bande support continue (18), le procédé comprenant les étapes consistant à :

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former une série de préformes d'emballage, dont chacune est configurée de façon à recevoir le produit à partir d'une source d'approvisionnement de produit ; et pour chaque préforme, former au niveau d'un poste de scellement (50) un joint de scellement transversal au travers de la préforme pour former un joint supérieur d'un emballage rempli, s'étendant en-dessous du poste de scellement (50) et un joint inférieur d'un emballage à remplir s'étendant au-dessus du poste de scellement (50) ;

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le procédé étant caractérisé en ce qu'il comprend en outre les étapes consistant à : choisir ladite bande support en un matériau pouvant être scellé ; positionner ladite bande (18) support de matériau pouvant être scellé, continue, adjacente aux préformes d'emballage ; et simultanément à la formation de la jonction transversale, fixer de façon détachable le som-

met de l'emballage rempli à la bande support (18) en déplaçant le sommet de l'emballage rempli contre la bande support de présentation (18) et en réalisant une jonction amovible au joint supérieur de l'emballage rempli avec la bande support (18). 5

8. Procédé selon la revendication 7, dans lequel le scellement des préformes au poste de scellement (50) est effectué par les mâchoires de scellement (52, 53) qui fixent simultanément, de façon qu'elle puisse être détachée, une extrémité de l'emballage rempli à la bande support (18). 10
9. Procédé selon la revendication 8, dans lequel une mâchoire de scellement (52) comprend une ouverture au travers de laquelle la bande support (18) peut passer, le procédé comprenant en outre le fait de faire passer la bande support (18) à proximité proche de la préforme d'emballage et à fixer de façon détachable la préforme d'emballage à la bande support au moyen des mâchoires de scellement (52, 53). 15
10. Procédé selon la revendication 9, dans lequel la bande support de présentation (18) est avancée à travers l'ouverture dans l'une des mâchoires de scellement (52) et en direction du poste de scellement (50), en faisant tourner une roue (36) d'avance pas à pas d'un dispositif d'entraînement (30) de la bande au moyen d'un moteur pas à pas (32) du dispositif (30) d'entraînement de la bande. 20

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FIG. I

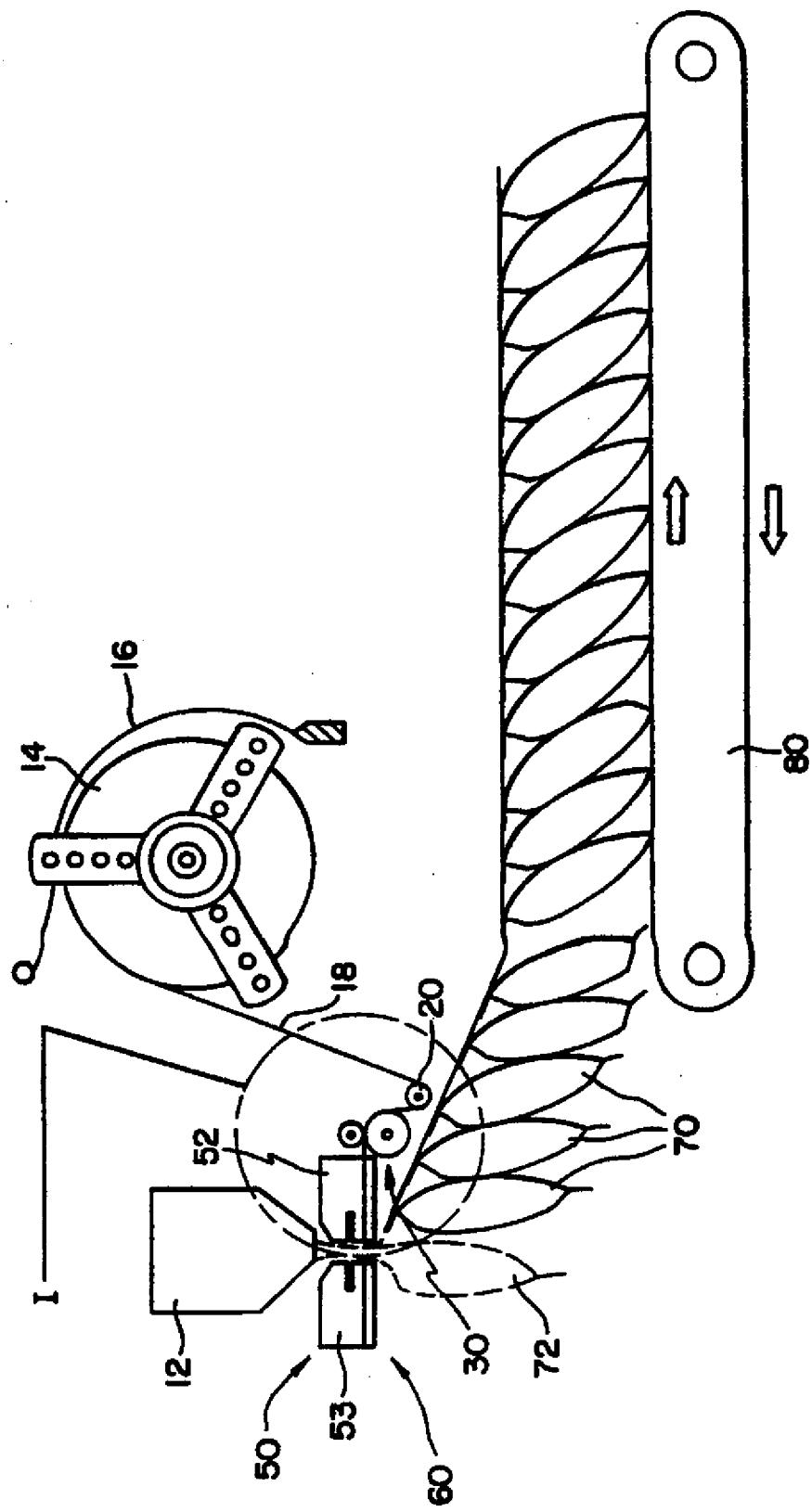


FIG. 2A

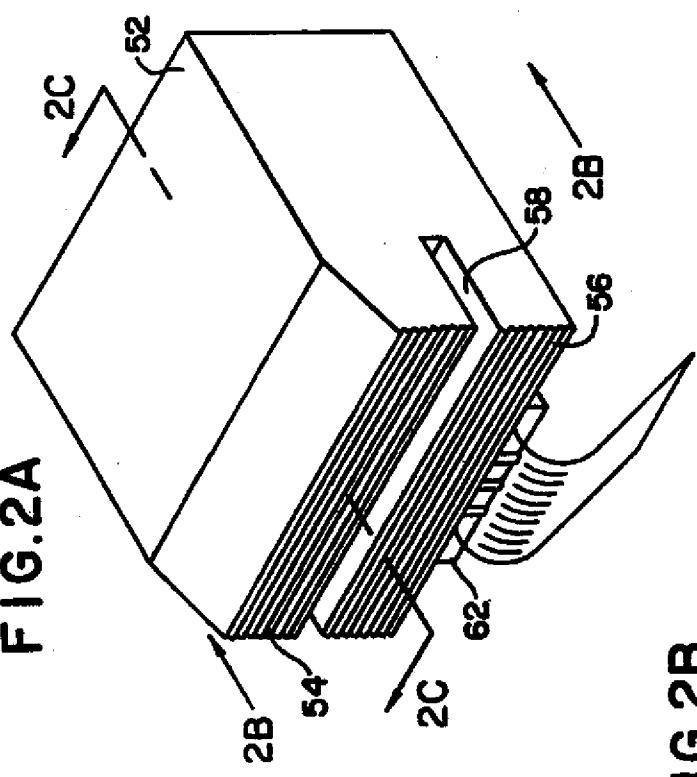


FIG. 2C

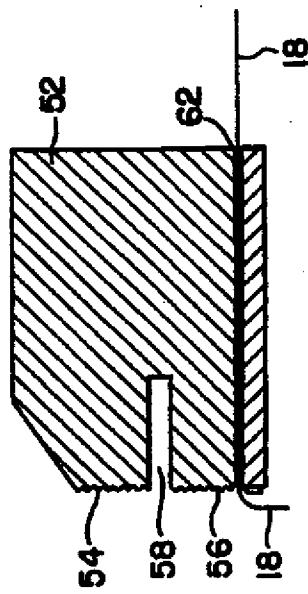


FIG. 2B

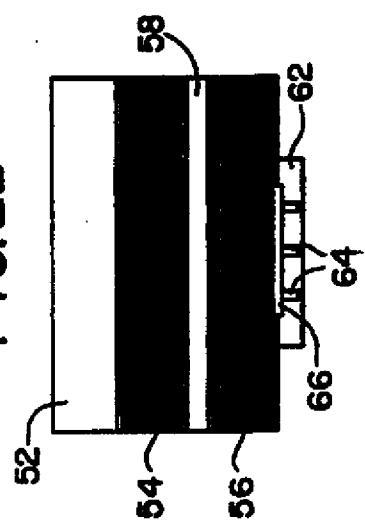


FIG. 3A

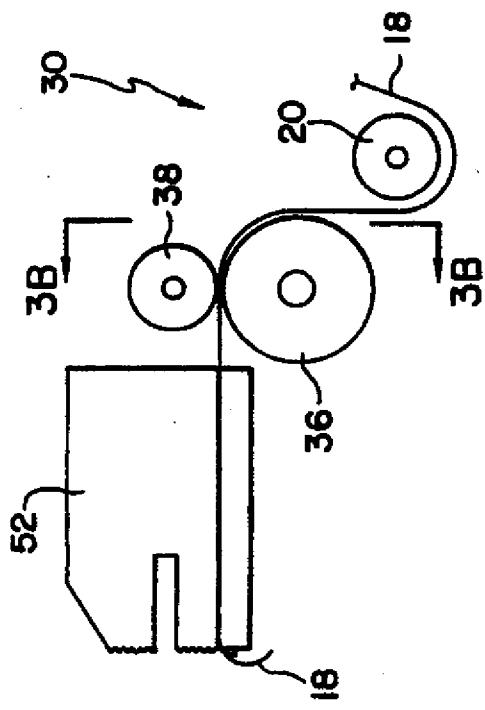


FIG. 3B

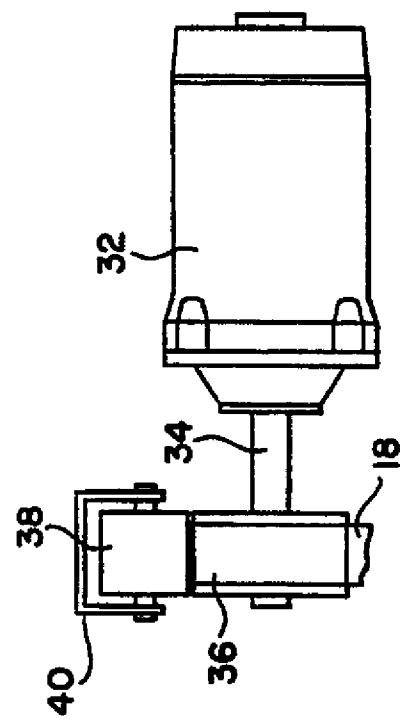


FIG. 4A

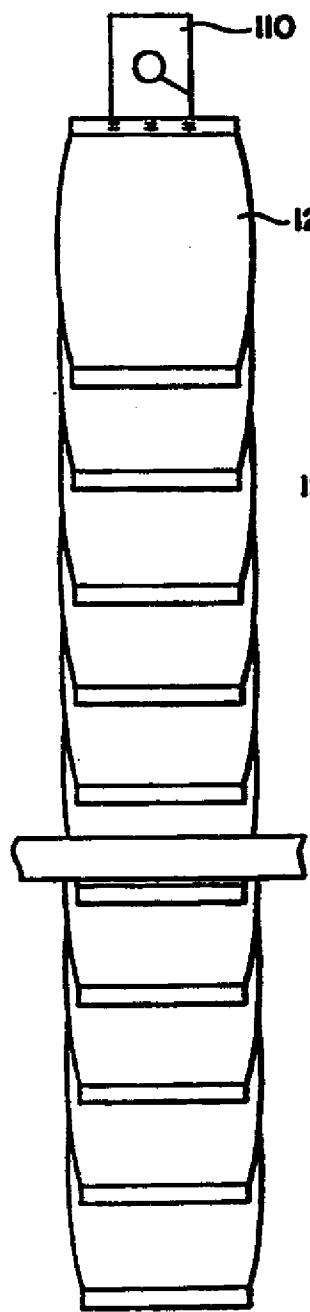


FIG. 4B

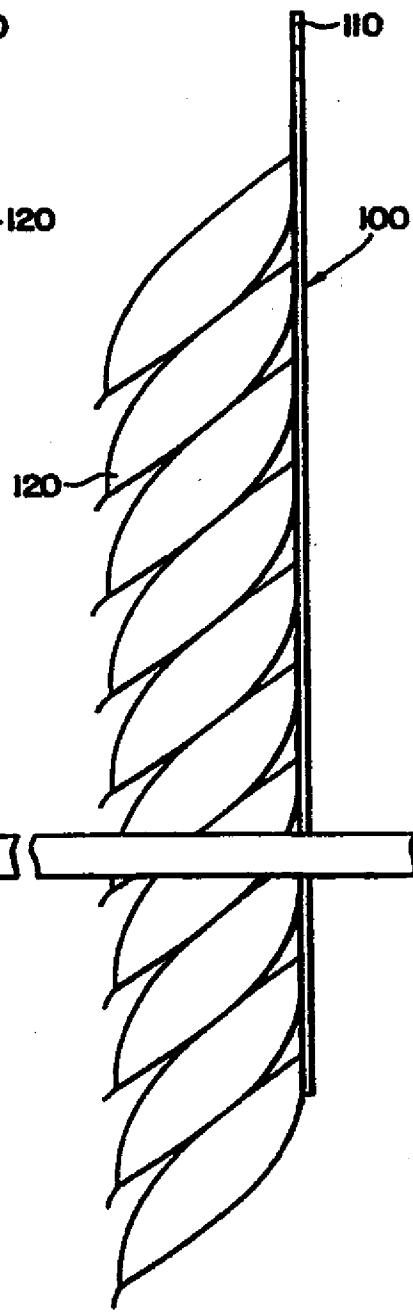


FIG. 4C

